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What is claimed is:

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1. An image recognizing method comprising the steps of:
  - (a) dividing an input image into local-segments;
  - (b) registering a learning image into a learning image database;
  - (c) extracting a learning-local-segment which is similar to one of the local-segments from the learning image database;
  - (d) relating the learning-local segment extracted in the step (c) to the one of the local-segments;
  - (e) estimating a position of an object to be identified in the input image from coordinates of the one of the local-segments and coordinates of the learning-local-segment;
  - (f) counting a pair of one of the local-segments and learning-local-segment from which a first position is estimated to determine a score for the first position; and
  - (g) judging that the object to be identified is present at the first position when the score is greater than a predetermined number.
2. An image recognizing method comprising the steps of:
  - (a) dividing an input image into local-segments;
  - (b) dividing a learning image into learning-local-segments having a same size as the local-segments and making a group of some of the learning-local-segments which are similar to each other;

(c) registering image data of a representative learning-local-segment of the group and coordinates of all the some of the learning-local-segments into a same-type window database;

5 (d) extracting a representative learning-local-segment which is similar to one of the local-segments from the same-type window database;

(e) relating the one of the local-segments to a group of which the representative learning-local-segment extracted in  
10 the step (d);

(f) estimating a position of an object to be identified in the input image from coordinates of the one of the local-segment and coordinates of the representative learning-local-segment of the group;

15 (g) counting a pair of one of the local segments and a representative learning-local-segment from which a first position is estimated to determine a score for the first position; and

(h) judging that the object to be identified is present  
20 at the first position when the score is greater than a predetermined number.

3. The image recognizing method according to claim 1, wherein:

25 said step (b) comprises the step of registering the learning

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image into the learning image database by a character of an object to be identified;

said step (c) comprises the step of extracting the learning-local-segment which is similar to the one of the  
5 local-segment from the learning image database by the character; and

said step (f) comprises the step of counting a pair of one of the local-segments and a learning-local-segment by the character.

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4. The image recognizing method according to claim 2, wherein said step (c) comprises the step of registering image data of the representative learning-local-segment of the group and coordinates of all the some of the learning-local-segments  
15 in the group and a character of an object to be identified into the same-type window database.

5. The image recognizing method according to claim 1, wherein the step (d) comprises the steps of:

20 (d-1) calculating a sum of one of (i) each square of a difference between a pixel value of the one of the local-segment and a pixel value of the learning-local-segments and (ii) each absolute of the difference, and extracting a pair of one of the local-segments and a learning-local-segment which has minimum  
25 one of the sum; and

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(d-2) relating the one of the local-segment to the learning-local-segment in the pair extracted in said step (d-1).

5 6. The image recognizing method according to claim 2, wherein said step (e) comprises the steps of:

(e-1) calculating a sum of one of (i) each square of a difference between a pixel value of the one of the local-segment and a pixel value of the representative learning-local-segment and (ii) each absolute of the difference, and extracting a pair of one of the local-segment and a representative learning-local-segment which has minimum one of the sum; and

(e-2) relating the one of the local-segment to the representative learning-local-segment in the pair extracted in said step (e-1).

7. An image recognizing apparatus comprising:

image dividing means for dividing an input image into local-segments;

20 learning means for registering a learning image into a learning image database;

similar window extracting means for extracting a learning-local-segment which is similar to one of the local-segments from the learning image database and for relating the learning-local-segment to the one of the

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local-segment;

object position estimating means for estimating a position  
of an object to be identified in the input image from coordinates  
of the one of the local-segment and coordinates of the  
5 learning-local-segment;

counting means for counting a pair of one of the  
local-segments and a learning-local-segment from which a first  
position is estimated by said object position estimating means  
to determine a score for the first position to determine a score  
10 for the first position; and

object determining means for judging that the object to  
be identified is present in the first position when the score  
is greater than a predetermined number.

15 8. An image recognizing apparatus comprising:

image dividing means for dividing an input image into  
local-segments;

learning means for dividing a learning image into  
learning-local-segments having a same size as the local-  
20 segments and for making a group of some of the learning-  
local-segments which are similar to each other and for  
registering a representative learning-local-segment of the  
group and coordinates of all the some of the learning-local  
segments into a same-type window database;

25 similar window extracting means for extracting from the

same-type window database the representative learning-local-segment of the group which is similar to one of the local-segments of the input image and for relating the learning-local-segments to the one of the local-segment;

5 object position estimating means for estimating a position of an object to be identified in the input image from coordinates of the one of the local-segment and coordinates of the learning-local-segment;

counting means for counting a pair of one of the  
10 local-segments and a learning-local-segments from which a first position is estimated by said object position estimating means to determine a score for the first position; and

object determining means for judging that the object to be identified is present at the first position when the score  
15 is greater than a predetermined number.

9. An image recognizing apparatus comprising:

image dividing means for dividing an input image into local-segments;

20 learning means for registering learning images by a character of a object to be identified into a learning image database;

similar window extracting means for extracting a learning-local-segment which is similar to one of the  
25 local-segments from the learning image database by the

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character and for relating the learning-local-segment to the one of the local-segment by the character;

object position estimating means for estimating a position of an object to be identified from coordinates of the one of  
5 the local-segment and coordinates of the learning-local-segment by the character;

counting means for counting a pair of one of the local-segments and a learning-local-segment from which a first position is estimated by said object position estimating means  
10 to determine a score for the first position by the character;  
and

object determining means for judging that the object to be identified is present at the first position when the score is greater than a predetermined number.

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10. The image recognizing apparatus according to claim 8, wherein said learning means includes:

similar window integrating means for making a group of some of the learning-local-segments which are similar to each other  
20 stored in the learning image database and for releasing image data of a representative learning-local-segment of the group and coordinates of all the some of the learning-local-segments in the group; and

a same-type window database for storing the image data of  
25 the representative learning-local-segment of the group and the

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coordinates of all the some of the learning-local-segments in the group.

11. A computer-readable storage medium holding a program  
5 for making a computer carry out an image recognizing method,  
said image recognizing method comprising the steps of:

(a) dividing an input image into local-segments;

(b) registering a learning image into a learning image  
database;

10 (c) extracting a learning-local-segment which is similar  
to one of the local-segment of the input image from the learning  
image database;

(d) relating the learning-local-segment extracted in the  
step (c) to the one of the local-segments;

15 (e) estimating a position of an object to be identified  
in the input image from coordinates of the one of the  
local-segments and coordinates of the learning-local-segment;

(f) counting a pair of one of the local-segments and a  
learning-local-segment from which a first position is estimated  
20 to determine a score for the first position; and

(g) judging that the object to be identified is present  
at the first position when the score is greater than a  
predetermined number.

25 12. An image recognizing apparatus for detecting a shape



of an object from an image, comprising:

an image database into which a shape identifier specifying the shape of the object and a model image, which is a image of the object having the shape, are preliminarily registered;

5 model generating means for extracting feature data of the shape from the model image;

a shape database for storing the feature of the shape with the shape identifier in a combination;

an image input unit for supplying an input image;

10 an image cutout unit for cutting out an image segment from the input image;

shape classifying means for comparing the image segment with the feature data of the shape to determine whether or not the object of the shape is present in the image segment; and

15 an output unit for releasing data about the shape of the object determined by said shape classifying means and data about a position of the shape of the object in the input image.

13. The image recognizing apparatus according to claim 12,  
20 wherein said model generating means is operative to:

extract an average image of the model image of the shape and a variance of each pixel in the model image as the feature data of the shape; and

release a combination of the average image, the variance,  
25 and the shape identifier into the shape database.

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14. An image recognizing apparatus for detecting a shape of an object from an image, comprising:

an image database preliminarily storing a shape identifier  
5 specifying the shape of the object and a model image which is an image of the object of the shape;

model generating means for calculating a base vector in a feature space from a pixel value of the model image, for projecting the model image in the feature space as a model image  
10 vector, for calculating a feature statistic value of the shape from the model image vector having the shape identifier as a feature shape parameter, and for adding the shape identifier to the feature shape parameter;

a shape database for storing the base vector, the feature  
15 shape parameter, and the shape identifier in a combination;

an image input unit for supplying an input image;

an image cutout unit for cutting out an image segment from the input image;

shape classifying means for projecting the image segment  
20 in the feature space to determine an image segment vector based on the base vector and for comparing the image segment vector with the model image using the feature shape parameter to determine whether or not the shape of the object is present in the image segment; and

25 an output unit for releasing data about the shape of the

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object and data about a position of the shape of the object in the input image when an object of which shape coincides the shape to be detected is present in the input image.

5        15. The image recognizing apparatus according to claim 14, wherein said model generating means is operative to calculate the feature shape parameter from an average vector and a covariance of the model image vector derived from the model image.

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16. The image recognizing apparatus according to claim 14, wherein said model generating means is operative to calculate an average image of the model image, calculate a base vector from a pixel value of the average image, project the model image in the feature space as a model image vector, and add the shape identifier to the model image vector.

17. The image recognizing apparatus according to claim 14, wherein the shape identifier includes data indicating what portion of the object the shape is.

18. The image recognizing apparatus according to claim 17, wherein said shape classifying means is operative to estimate an overall area which the object occupies in the input image from the image segment of the shape identifier and sum up the

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overall area estimated for the image segment to output a position of the overall area of the object.

19. An image recognizing method for detecting a shape of an object from an image, comprising the steps of:

registering a shape identifier specifying the shape of the object to be identified and an image of the object having the shape as a model image into an image database;

extracting feature data of the shape from the model image;

releasing the feature data of the shape and the shape identifier in a combination into a shape database;

supplying an input image to be determined whether or not the object is present therein;

cutting out an image segment from the input image;

comparing the image segment with the feature data of the shape to determine whether or not the object of the shape to be identified is present in the image segment; and

releasing data about the shape of the object and data about a position of the shape of the object in the input image.